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A LIST OF FLORIDA ANTS*

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The following list embracing some 76 species, although probably far from being complete is presented here with the hope that it may be of some aid to taxonomists and to others who are especially interested in the fauna of our country. Florida occupies a unique geographical position, myrmecologically speaking, in that it contains many ants which are indigenous to the West Indies and to the neighboring islands. Some of the species which are common to Florida and the neighboring islands are for example: *Euponera* (T) *stigma* (Fabr.), *Cyphomyrmex rimosus* subsp. *minutus* Mayr, *Cryptocerus varians* F. Smith, *Tapinoma littorale* Wheeler, and *Pseudomyrma elongata* Mayr.

Florida also has her share of imported species, among these may be mentioned: *Monomorium pharaonis* (Linn.) and *M. floricola* (Jerdon), *Solenopsis geminata* subsp. *rufa* (Jerdon), *Tetramorium guineense* (Fabr.), *Wasmannia auropunctata* (Roger), *Tapinoma melanocephalum* (Fabr.), *Paratrechina longicornis* (Latr.), and *Paratrechina bourbonica* Forel var. It is very strange that the Argentine ant, *Iridomyrmex humilis* Mayr is not amongst these.

Quite a number of North American ants have been described from Florida by Emery and Wheeler. It is to be regretted that Emery failed in many instances to cite specific type localities in connection with his descriptions and designated the specimens he was describing only as from Florida.

Although numerous collectors and systematists have collected in Florida and must undoubtedly have taken many ants, I have had no access to their collections or notes. The information on which this paper is based has been gleaned from various publi-

*(Contribution from the Mississippi Agricultural Experiment Station.)

cations which I have seen, and from the determinations I have made of specimens sent me by Dr. W. S. Blatchley, and Messrs. S. O. Hill, R. H. Hicks, H. T. Woodruff, and Hermann Raster. I am very greatly indebted to these gentlemen for the records and especially so to Dr. Blatchley who has in addition furnished many notes in connection with his specimens.

PONERINAE

1. **Euponera (Trachymesopus) stigma** (Fabricius).
Ft. Worth. P. J. Schmitt. (Wheeler and Gaige, Psyche, Vol. 27, p. 69, (1920)).

2. **Ponera coarctata** subsp. **pennsylvanica** (Buckley).
Florida. (Emery, Zool. Jahrb. Syst. Vol. 8, p. 268, (1895)).

3. **Ponera trigona** var. **opacior** Forel.
Jacksonville. (Wheeler, Bull. Amer. Mus. Nat. Hist. Vol. 24, p. 405, (1908)).

4. **Ponera opaciceps** Mayr.
Royal Palm Park.—W. S. Blatchley. "Nests beneath boards and stones in the everglades"; Dunedin.—W. S. Blatchley.

5. **Leptogenys (Lobopelta) elongata** (Buckley).
Belleair. (Wheeler, Bull. Amer. Mus. Nat. Hist. Vol. 24, p. 407, (1908)).

6. **Odontomachus haematodes** subsp. **insularis** Guérin.
Florida. (Emery, Zool. Jahrb. Syst. Vol. 8, p. 268, (1895)). Royal Palm Park.—W. S. Blatchley. "Beaten from dead leaves of royal palm. Nests beneath stones in the dense hammock"; Saint Petersburg.—H. Raster.

7. **Stigmatomma pallipes** (Haldeman).
Dunedin.—W. S. Blatchley.

DORYLINAE

8. **Eciton (Acamatus) opacithorax** Emery.
Saint Augustine.—C. T. Brues.

9. **Eciton (Acamatus) schmitti** Emery.
Florida. This species undoubtedly occurs in the state as it is common in the adjoining states.

PSEUDOMYRMINAE

10. **Pseudomyrma pallida** F. Smith.
Florida. (Emery, Zool. Jahrb. Syst. Vol. 8, p. 269, (1895)).

11. **Pseudomyrma flavidula** F. Smith.
Key West. (Emery, ibidem, p. 269); Royal Palm Park.—W. S. Blatchley. "Many examples of this slender bodied, pale yellowish species were beaten singly into the umbrella from foliage along the borders or paths of the dense hammocks. Others were taken by sweeping in low ground. It nests in the twigs or stems of plants."

12. **Pseudomyrma elongata** Mayr.
Key West. (Emery, ibidem p. 269); Royal Palm Park.—W. S. Blatchley.

13. **Pseudomyrma brunnea** F. Smith.
Haw Creek, Volusia County. (Emery, ibidem, p. 269.) Royal Palm Park.—W. S. Blatchley. "Nests in the roots of bunches of grass along the ditches."

MYRMYCINAE

14. **Monomorium minimum** (Buckley).
Florida. (Emery, ibidem, p. 274.)

15. **Monomorium floricola** (Jerdon).
Florida. (Emery, ibidem, p. 275); Royal Palm Park.—W. S. Blatchley. "Nests beneath stones in damp localities."

16. **Monomorium pharaonis** (Linnaeus).
Royal Palm Park.—W. S. Blatchley. "In December it occurred by the hundreds in my room at the lodge, where it attacked such of my specimens of insects as were not in capsules, or tightly closed pill boxes"; Miami.—H. T. Woodruff.

17. **Xenomyrmex stolli** subsp. **floridanus** Emery.
Lake Worth, type locality. (Emery, Zool. Jahrb. Syst. Vol. 8, p. 275.)

18. **Solenopsis geminata** (Fabricius).
Florida. (Emery, ibidem, p. 276.)

19. **Solenopsis geminata** subsp. **rufa** (Jerdon).
Royal Palm Park.—W. S. Blatchley. "Nesting beneath stones and boards, in tufts of grass and beneath the bark of pine logs." Saint Petersburg.—H. Raster; Miami Beach.—S. O. Hill.

20. **Solenopsis picta** Emery.
Florida, type locality. (Emery, Zool. Jahrb. Syst. Vol. 8, p. 279.)

21. **Solenopsis laeviceps.** ? Mayr.
Dunedin.—W. S. Blatchley.

22. **Pheidole flavens subsp. floridana** Emery.
Cocoanut and St. George, type locality (Emery, ibidem, p. 293). Royal Palm Park.—W. S. Blatchley. "Nests beneath loose bark of pine logs"; Dunedin.—W. S. Blatchley.

23. **Pheidole metallescens** Emery.
St. George, type locality. (Emery, ibidem, p. 294); Royal Palm Park.—W. S. Blatchley.

24. **Pheidole morrisi** Forel.
Florida. (Emery, ibidem, p. 295); Royal Palm Park.—W. S. Blatchley; Saint Petersburg.—H. Raster.

25. **Pheidole dentata** Mayr.
Royal Palm Park.—W. S. Blatchley. "Nests beneath boards in damp places."

26. **Pheidole dentata** var. **commutata** Mayr.
Florida, type locality, (Emery, Zool. Jahrb. Syst. Vol. 8, p. 295, (1895)).

27. **Pogonomyrmex badius** (Latreille).
Florida. (Emery, Zool. Jahrb. Syst. Vol. 8, p. 310, (1895)). Saint Petersburg.—H. Raster; Rock Springs.—H. T. Woodruff.

28. **Leptothorax (Dichothorax) pergandei** subsp. **f'oridanus** Emery.
Florida, type locality. (Emery, ibidem, p. 324.)

29. **Tetramorium guineense** (Fabricius).
Florida. (Emery, ibidem, p. 324); Royal Palm Park.—W. S. Blatchley.

30. **Cardiocondyla emeryi** Forel.
Miami. (Wheeler, Bull. Amer. Mus. Nat. Hist. Vol. 34, p. 393, (1915)).

31. **Wasmannia auropunctata** (Roger).
Miami.—R. H. Hicks; Fort Lauderdale.—S. O. Hill.

32. **Myrmecina graminicola americana** var. **brevispinosa** Emery.
Royal Palm Park.—W. S. Blatchley.

33. **Aphaenogaster mariae** Forel.
Florida. (Mayr. Verh. Zool.-bot. Ges. Wien, Vol. 36, p. 443 (1886)).

34. **Aphaenogaster fulva** subsp. **aquia** (Buckley).
Royal Palm Park.—W. S. Blatchley.

35. **Aphaenogaster lamellidens** Mayr.
Florida. (Mayr. Verh. Zool.-bot. Ges. Wien, Vol. 36, p. 444, (1886)).

36. **Aphaenogaster texana** var. **furvescens** Wheeler.
Royal Palm Park.—W. S. Blatchley.

37. **Aphaenogaster treatae** var. **ashmeadi** Emery.
Florida, type locality. (Emery, Zool. Jahrb. Syst. Vol 8, p. 302, (1895)).

38. **Atta (Trachymyrmex) septentrionalis** var. **seminole** Wheeler.
Miami, type locality. (Wheeler, Jr. N. Y. Ent. Soc. Vol. 19, p. 247, 1911)).

39. **Cyphomyrmex rimosus** subsp. **minutus** Mayr.
Planter & Key Largo. (Wheeler, Bull. Amer. Mus. Nat. Hist. Vol. 23, p. 722, (1907)); Royal Palm Park.—W. S. Blatchley. "Found beneath bark of pine logs on Long Pine Key and in woody fungi in the hammock near the lodge."

40. **Cryptocerus varians** F. Smith.
Key West. (Emery, Zool. Jahrb. Syst. Vol. 8, p. 325, (1895)).

41. **Crematogaster minutissima** Mayr.
Royal Palm Park.—W. S. Blatchley; Dunedin.—W. S. Blatchley.

42. **Crematogaster opaca depilis** var. **punctulata** Emery.
Royal Palm Park.—W. S. Blatchley.

43. **Crematogaster laeviuscula** Mayr.
Florida. (Emery, Zool. Jahrb. Syst. Vol. 8, p. 285, (1895)). Royal Palm Park.—W. S. Blatchley.

44. **Crematogaster lineolata** Say.
Florida. (Emery, ibidem, p. 282).

45. **Crematogaster ashmeadi** Mayr.
Key West. (Emery, ibidem, p. 286). Royal Palm Park.—W. S. Blatchley.

46. **Crematogaster atkinsoni** Wheeler.
Royal Palm Park.—W. S. Blatchley. "This ant builds nests of a kind of paper which it makes from vegetable debris. These nests

are attached to various objects. Two of them about the size of a quart cup were noted on Long Pine Key. They were fastened to the twigs of low shrubs growing in moist places. When the nest is disturbed the ants become very ferocious rushing forth by hundreds. They cling in bunches and try to bite the collecting forceps until they are shaken into the cyanide bottle." Fort Myers, type locality. (Wheeler, Psyche, Vol. 26, p. 108 (1919)).

DOLICHODERINAE

47. **Dolichoderus plagiatus** subsp. **pustulatus** Mayr.
Royal Palm Park.—W. S. Blatchley. "Found nesting beneath loose bark of pine logs on Long Pine Key, and beneath boards on the ground near the old tomato packing shed. Also swept from weeds in old fields."

48. **Dolichoderus plagiatus** subsp. **pustulatus** var.
Royal Palm Park.—W. S. Blatchley.

49. **Tapinoma melanocephalum** (Fabricius).
Royal Palm Park.—W. S. Blatchley; Saint Petersburg.—H. Raster.

50. **Tapinoma littorale** Wheeler.
Card's Point. (Wheeler, Bul. Amer. Mus. Nat. Hist. Vol. 21, p. 109, 1905)).

51. **Tapinoma sessile** (Say).
Florida. (Mayr. Verh. Zool.-bot. Ges. Wien, Vol. 36, p. 434, (1886)).
Royal Palm Park.—W. S. Blatchley.

52. **Dorymyrmex pyramicus** Roger.
Florida. (Emery, Zool. Jahrb. Syst. Vol. 8, p. 331, 1895.)

53. **Dorymyrmex pyramicus** var. **flavus** McCook.
Florida. (Emery, ibidem, p. 332.)

54. **Iridomyrmex pruinosus** (Roger).
Florida. (Emery, ibidem, p. 333); Royal Palm Park.—W. S. Blatchley, "Found nesting in December beneath a chunk of decaying limestone on Long Pine Key"; St. Petersburg.—H. Raster.

55. **Iridomyrmex pruinosus** var. **analis** (Andre).
This species undoubtedly occurs in Florida, although I have seen no specimens of it from that state nor have I seen any records of its occurrence there.

FORMICINAE

56. **Lasius niger alienus** var. **americanus** Emery.
Florida. (Mayr, Verh. Zool.-bot. Ges. Wien, Vol. 36, p. 429, (1886)).

57. **Lasius brevicornis** Emery.
Florida. (Emery, Zool. Jahrb. Syst. Vol. 8, p. 639, (1895)).

58. **Lasius (Acanthomyops) claviger** (Roger).
Florida. (Emery, Zool. Jahrb. Syst. Vol. 8, p. 642, (1895)).

59. **Brachymyrmex heeri** subsp. **depilis** Emery.
Florida. (Emery, Zool. Jahrb. Syst. Vol. 7, p. 635, (1893)).

60. **Paratrechina longicornis** (Latreille).
Royal Palm Park.—W. S. Blatchley; St. Petersburg.—H. Raster.

61. **Paratrechina (Nylanderia) parvula** Mayr.
Florida. (Emery, ibidem, p. 636.)

62. **Paratrechina (Nylanderia) vividula** (Nylander).
Florida. (Mayr. ibidem, p. 431.)

63. **Paratrechina (Nylanderia) bourbonica Forel var.**
Miami Beach.—S. O. Hill. "On pavement and sand."
An imported species heretofore unrecorded from the United States.

64. **Prenolepis imparis** (Say).
Florida. (Mayr. Verh. Zool.-bot. Ges. Wien, Vol. 36, p. 431, (1886)).

65. **Formica pallide fulva schaufussi** Mayr. **var.**
St. Petersburg.—H. Raster.

66. **Camponotus caryae** (Fitch).
Florida. (Emery, Zool. Jahrb. Syst. Vol. 7, p. 675. (1893)).

67. **Camponotus caryae** subsp. **rasilis** Wheeler.
Royal Palm Park.—W. S. Blatchley.

68. **Camponotus caryae rasilis** var. **pavidus** Wheeler.
Jacksonville & Atlantic Beach. (Wheeler, Jr. N. Y. Ent. Soc., Vol. 18, No. 4, p. 229, (1910)).

69. **Camponotus (Colobopsis) pylartes** Wheeler.
Royal Palm Park.—W. S. Blatchley.

70. **Camponotus (Colobopsis) impressus** Roger.
Florida. (Emery, Zool. Jahrb. Syst. Vol. 7, p. 681, (1893)).

71. **Camponotus (Myrmobrachys) planatus** Roger.
Fort Myers.—S. O. Hill; Miami, Card's Point, Planter, Key Largo. (Wheeler, Ann. N. Y. Acad. Sci. Vol. 20, pt. 2, p. 348, (1910)).

72. **Camponotus (Myrmoturba) maculatus** subsp. **tortuganus** Emery.
Dry Tortugas. (Emery, Zool. Jahrb. Syst. Vol. 8, p. 336, (1895)).
Royal Palm Park.—W. S. Blatchley; Lake Worth, Miami, and Planter (Wheeler Ann. N. Y. Acad. Sci. Vol. 20, no. 6, pt. 2, p. 312, (1910)).

73. **Camponotus (Myrmoturba) abdominalis** subsp. **floridanus** (Buckley).
Lake Worth, Miami, Key Largo, and Coosahatchie River. (Wheeler, Annals N. Y. Acad. Sci. Vol. 20, pt. 2, no. 6, p. 326, (1910)). Royal Palm Park.—W. S. Blatchley, "This, the largest and most common ant taken, occurred in numbers in rotten wood and beneath bark in the hammock and beneath a third or more of all boards and stones turned over while in search of beetles." St. Petersburg.—H. Raster; Fort Myers.—S. O. Hill; Cocoa.—H. T. Woodruff.

74. **Camponotus castaneus** Latr.
Florida. (Mayr. Verh. Zool.-bot. Ges. Wien, Vol. 36, p. 422, (1886)).

75. **Camponotus castaneus** subsp. **americanus** Mayr.
Quincy. (Wheeler, Ann. N. Y. Acad. Sci. Vol. 20, pt. 2, p. 324, 1910)).

76. **Camponotus socius** Roger.
Sanford, Green Cove Springs, (Wheeler, ibidem, p. 321, (1910)).
Florida. (Emery, Zool. Jahrb. Syst. Vol. 7, p. 670, (1893)).

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NEW APHICIDES*

A. N. TISSOT AND W. L. THOMPSON

Among the various substances used for controlling aphids, nicotine sulphate has long been considered as the standard by which others were judged. Soaps of various kinds, extracts and powders of pyrethrum, derris and quassia were frequently used but could not always be depended upon to give good results. Nicotine sulphate was much more certain to give a good kill but its cost was a serious objection to its general use. Recently, new materials have been prepared and placed on the market which will help to satisfy the demand for better and cheaper aphicides.

During the spring and summer of 1929 experiments with some of these newer materials were conducted by the senior author at the Main Experiment Station at Gainesville and by the junior author at the Citrus Experiment Station at Lake Alfred. In the following pages these experiments are briefly discussed and the results of the tests given in tabular form.

METHOD OF MAKING THE TESTS

The experiments conducted at Gainesville, the results of which are summarized in Tables Nos. 1 and 2 were laboratory tests. Two species of aphids were employed. The results obtained with the pea aphid, *Illinoia pisi* (Kalt.), are given in Table No. 1, while the green citrus aphid, *Aphis spiraecola* Patch, was used

*Contribution from Department of Entomology, Florida Agricultural Experiment Station.

in the tests recorded in Table No. 2. In both series of experiments the sprays were applied with a one-quart hand atomizer. The counts of the aphids were made approximately 24 hours after the sprays were applied. None of the curled leaves were removed from the citrus shoots before spraying. In some cases these curled leaves afforded protection to the aphids and thus influenced the results. These cases are indicated by an asterisk in Table No. 2. A smaller number of field tests were made in which a three-gallon compressed-air sprayer was used for spraying peas heavily infested with aphids. These gave results very similar to those obtained in the laboratory. In the tests conducted at Lake Alfred a three-gallon compressed-air sprayer was used in every case except where noted in Table No. 3. Only the green citrus aphid, *Aphis spiraecola* Patch, was used in these tests, and all curled leaves were removed from the twigs before the sprays were applied.

NEW SPREADERS FOR NICOTINE

Unless nicotine sulphate is used in connection with lead arsenate or bordeaux mixture it is necessary to use soap or some other substance to act as a spreader. Using ordinary soap or casein spreaders one part of nicotine sulphate (40%) to 750 or 800 parts of water was the most dilute spray solution that would give a good kill of aphids. The amount of soap or other spreader used depended upon the relative hardness of the water.

NEW SOAP SPREADERS

Grandpa's Wonder Spray is a pine tar soap which is sold in flake form. It does not easily dissolve in cold water but it is necessary to dissolve the flakes in a small amount of warm water before putting it into the spray tank. This soap is far superior to ordinary soaps as a spreader or carrier for nicotine. At Lake Alfred good results were obtained when it was used at the rate of one pound to 100 gallons of water with Black Leaf 40 or 50 percent free nicotine 1-3000. With harder water two pounds of the soap to 100 gallons of water should be used. Another soap which was used with good results was sodium oleate. Used at the rate of one pound to 100 gallons of water with Black Leaf 40, 1-4000, it gave a good kill of citrus aphids. This soap was in a finely granulated form rather difficult to get into solution, hot water and vigorous agitation being required.

OILS

Some of the standard oil emulsions such as are used for scale insects and whiteflies were found to be fairly good spreaders for nicotine. A one percent solution of these oils with free nicotine 50 percent at 1-4000 gave a very good kill of citrus aphids. No injury was apparent on tender citrus foliage after 48 hours but they should be used with a great deal of caution on tender vegetables. Penetrol, a sulfonated oxidized oil, gave very promising results. This material readily forms an emulsion with cold water, very little agitation being required. It can be used on tender foliage without injury. Using a one-half of one percent solution only one-fourth as much nicotine is necessary as with ordinary spreaders. In case there are many curled leaves on the infested plants it would probably be advisable to use a three-fourths of one or one percent solution as this will penetrate into the curled leaves better than the more dilute solution and will result in a more complete kill of the aphids. Some preliminary tests conducted at Gainesville indicate that this oil can also be used with the pyrethrum sprays enabling one to greatly reduce the amount of pyrethrum needed.

CHEAPER DUSTS

Some interesting results were obtained from some tests conducted at Lake Alfred with nicotine-lime dusts. It was found that a two percent dust made with free nicotine was just as effective for killing aphids as a three percent dust made with nicotine sulphate. The free nicotine is much more volatile and the gas is given off much more rapidly than from the nicotine sulphate. This results in a high concentration of gas soon after the dust is applied. The prices of nicotine sulphate and 50 percent free nicotine are based upon their nicotine content; thus the free nicotine contains 25 percent more nicotine and costs 25 percent more than the nicotine sulphate. The fact that one need use only four pounds of the free nicotine as against seven and one-half pounds of the nicotine sulphate for 100 pounds of dust means quite a saving in the cost of the dust.

The appearance of these new materials upon the market should mark the beginning of a great step forward in aphid control. A saving of one-third or one-half the cost of spray materials may be effected. This will mean that those who have been spraying regularly for control of aphids can now do so more economically.

It should also mean a general and widespread effort at control by those who formerly made no effort to protect their crops from aphids.

TABLE No. 1.—SPRAY EXPERIMENT WITH PEA APHID, *Illinoia pisi* (KALT).

Insecticide	Spreaders						
	Grandpa's Wonder Spray			Sodium Oleate		Penetrol	
	1 lb. to 100 gal.	2 lbs. to 100 gal.	3 lbs. to 100 gal.	2 lbs. to 100 gal.	4 lbs. to 100 gal.	½%	1%
Red Arrow 1 oz. to 4 gal. water	467* 95.1%	478 92.1%					
Evergreen 1-400		501 92.8%	545 98.9%				
Evergreen 1-800		539 90.2%	494 93%				
Black Leaf 40 1-750		606 99.5%		630 99.4%	604 99.6%	920 99.2%	550 100%
Black Leaf 40 1-1000	495 94.1%	1158 98.2%		676 98.5%	615 99.6%	519 96.5%	1086 97.9%
Black Leaf 40 1-1500		1060 97.6%		550 97.5%	624 100%	511 97.4%	
Black Leaf 40 1-2000				558 96.9%	643 99.5%		650 98.8%
Black Leaf 40 1-3000				585 95.7%	505 99.2%		1206 98.5%
Black Leaf 40 1-4000				607 95.2%	660 95.3%		562 92.5%
Free Nicotine 50% 1-1000		1142 97 %		512 99 %	590 100%		
Free Nicotine 50% 1-2000		1073 96 %		641 97.5%	544 98.5%		
Free Nicotine 50% 1-3000				634 94.1%	605 98.2%		
Free Nicotine 50% 1-4000				513 93.7%	569 99.4%		

*For the various combinations of insecticides and spreaders read across and down. Upper number indicates total number of aphids sprayed, lower the percentage of kill.

TABLE No. 2.—SPRAY EXPERIMENTS WITH CITRUS APHID,

Insecticide	Spreaders					
	Penetrol		Grandpa's Wonder Spray		Octagon Laundry Soap	
	½%	1%	3 lbs. to 100 gal.	5 lbs. to 100 gal.	½ lb. to 20 gal.	1 lb. to 20 gal.
Neoton ¼ pound to 20 gal. water				473 92.4%*	472 81.9%	518 94.4%
Neoton ½ pound to 20 gal. water						588 96.2%
Black Leaf 40 1-750	513 97.2%	542 95.2%				
Black Leaf 40 1-1000	1036 83.3%*	495 94.1%				
Black Leaf 40 1-2000	645 97.2%	509 94.3%				
Black Leaf 40 1-3000		503 98.6%				
Black Leaf 40 1-4000		497 96.3%				
Free Nicotine 50% 1-1000	523 98.8%					
Free Nicotine 50% 1-2000	486 97.3%					
Free Nicotine 50% 1-3000	476 96 %					
Red Arrow 1-500		540 98.7%				
Red Arrow 1-1000		596 95.6%		581 95.2%		
Red Arrow 1-2000		602 69.6%*		555 90.9%		
Red Arrow 1-3000		562 98.4%				
Evergreen 1-400		553 98.3%	552 90.7%			
Evergreen 1-800		487 95.4%	510 87.4%			
Evergreen 1-1500		496 82.2%*				
Evergreen 1-2000		493 77.1%*				

*Most of aphids which survived were inside of curled leaves.

TABLE No. 3.—SPRAY EXPERIMENTS WITH CITRUS APHID (*Aphis Spiraecola* Patch) at Lake Alfred.

Spreaders	Insecticides						
	Black Leaf 40				Free Nicotine 50%		
	1 to 1000	1 to 2000	1 to 3000	1 to 4000	1 to 2000	1 to 3000	1 to 4000
Penetrol ½%		1300 100%	1801 99.9%	2345 98.7%			
Penetrol ¾%		3449 99.3%	601 99.8%	1903 99.8%			
Penetrol 1%	1200 100%	2311 99.4%					
Penetrol ½%*			97%	96%			
Penetrol ½%**			98%	97%			
Citro Emulsion 1%					1505 99+%	1203 99+%	506 98+%
Floridoil 1%					604 99+%	305 98+%	711 98+%
Volck 1%						1005 99+%	1103 99+%
Grandpa's Wonder Spray 6¼ pounds to 100 gal.					1304 99.6%		
Grandpa's Wonder Spray 1 pound to 100 gal.					1062 98.8%	553 99.4%	
Sodium oleate 4 pounds to 100 gal. water					1505 99+%	952 99+%	
Sodium oleate 2 pounds to 100 gal. water						1126 99+%	750 100%
Sodium oleate 2 pounds to 100 gal. water					973 99+%	901 99+%	1200 100%
Sodium oleate 1 pound to 100 gal. water					802 99+%	700 100%	972 99+%

*Spray applied with 200-gallon power sprayer using spray rod—Percent of kill approximate.

**Spray applied with 200-gallon power sprayer using spray gun—Percent of kill approximate.

THE SCARABAEIDAE OF FLORIDA

By W. S. BLATCHLEY
Dunedin, Florida

(Continued from Vol. XIII, page 77)

Genus XXXVIII. RUTELA Latreille.

Elongate-oval, convex, glabrous species above the medium in size and having the clypeus not reflexed; upper surface of body wholly smooth; thorax in this and the next genus without basal marginal line; all tarsal claws entire.

154. (13786). **R. formosa** Burm.

Length 13.8-16 mm. Head pale yellow, the sides black; thorax black, with sides and several small discal spots dull yellow; elytra yellow, each with suture and three narrow black stripes, the latter not reaching base.

Metacombe Key, collected by Ashmead (Horn, 1880a). Chokoloskee and Key Largo (Schf.). A West Indian species so far definitely recorded from Florida only from the southern keys.

Genus XXXIX. POLYMOECHUS LeConte.

Differs from *Rutela* in having the clypeus reflexed and bidentate; upper surface of body coarsely and deeply sculptured; male with the large claws of middle and hind tarsi deeply cleft.

155. (13787). **P. brevipes** Lec.

Length 14-17 mm. Oblong, subcylindrical, strongly convex; uniform dark chestnut-brown to blackish, glabrous above, sterna with long dense yellowish hairs; front tibiae with the two outer teeth approximate and near the base of the apical process.

Enterprise, rare (Sz.). The only State record.

Subfamily DYNASTINAE

Beetles of medium or very large size having the labrum usually invisible; front coxae transverse, not prominent; front of mentum narrowed and subacuminate, rarely truncate; antennae 10-jointed; pygidium exposed; tarsal claws equal, not toothed beneath. Males often with the head and sometimes the thorax armed with prominent horns. To the subfamily belong the largest of the Florida Scarabaeidae. All are phytophagous but, on account of their comparative scarcity, do little injury.

KEY TO TRIBES OF FLORIDA DYNASTINAE

a. Body convex, usually more or less oval; labial palpi inserted at the sides of the mentum.

b. Head and thorax unarmed in both sexes, the latter never impressed near apex; body covering thin, often variegated in color; male with last joint of front tarsi stouter than in female, the claws very irregular. Genera XL and XLI. Tribe CYCLOCEPHALINI.

bb. Head or thorax, or both, armed with a tubercle or horn in both sexes; body covering thick, never variegated in color (except in *Dynastes).*

c. Tarsi short, tapering, the basal joint triangular; length less than 35 mm. Genera XLII-XLVI. Tribe ORYCTINI.

cc. Tarsi long, thick, basal joint not triangular; color greenish-gray with black spots; length 32-47 mm. Genus XLVII. —Tribe DYNASTINI.

aa. Body elongate-oblong, robust, flattened above; head and thorax armed in both sexes; labial palpi inserted behind the mentum; color black; body covering thick, strongly sculptured. Genus XLVIII. —Tribe PHILÆURINI.

Genus XL. OCHROSIDIA Casey.

This generic name replaces *Cyclocephala* Latreille, a name formerly wrongly used for our North American species. It comprises dull yellow species of oblong or oblong-oval form having the head and thorax unarmed, the latter never impressed or foveate; labial palpi inserted at sides of mentum; mandibles narrow, scarcely curved, not toothed; clypeus flat, finely margined, reflexed at apex; basal marginal line of thorax absent. Males, in our species, with fifth joint of front tarsi much enlarged; antennal club longer than stem and large claw of front tarsus unequally cleft, the outer branch very slender.

***156. (13798). O. parallela** Csy., 1915, 144.

Length 11-12.3 mm. Male:—elongate, subcylindrical, sides parallel; pale dull yellow, shining; head piceous, clypeus reddish-brown; glabrous above, rather thickly pubescecnt beneath; clypeus semicircular, finely and sparsely punctate, margins strongly reflexed; elytra one-fourth longer than wide.

"Florida, four examples" (Csy.). Dunedin, July 1, Oct. 1, two males at porch light (Bl.).

***157. (13801). O. immaculata** (Oliv.).

Length 9.5-12.5 mm. Oblong-oval, broader behind; pale yellowish-brown, shining, head black, clypeus obscure rufous; glabrous above, very sparsely

pubescent beneath; clypeus subtrapezoidal. thickly and shallowly rugosely punctate, margins moderately reflexed; elytra a fifth longer than wide.

Common throughout the State, especially so at light, April-July. Recorded and at hand from numerous stations from St. Augustine to Everglade and Miami.

*158. (13803). **O. villosa** (Burm.).

Length 10.8-13.5 mm. Oblong, sides subparallel; clypeus and thorax reddish-brown, head black, elytra dark brownish-yellow; upper surface sparsely, under surface thickly, pubescent; margins of elytra ciliate; clypeus shorter, more broadly rounded than in the preceding species. Male with antennal club much longer than stem.

Gainesville, at light, June (Doz.); Enterprise (Dietz). Istokpoga, March 29; Dunedin, April 23, at porch light (Bl.).

159. (13804). **O. puberula** (Lec.).

Length 8.7-10 mm. Pale brownish-yellow, above with numerous short erect hairs; head piceous, shining; clypeus reddish-brown, transverse, very finely, sparsely punctate, its margin broadly rounded, strongly reflexed.

Tampa, very rare (Sz.); St. Augustine (Ham.); Sevenoaks (Wick.); Lake City, June 2 (Ag. Coll.); Enterprise (Dietz); La-Belle, Apr. 27 (Dav.). Known only from Georgia and Florida.

Genus XLI. DYSCINETUS Harold.

Elongate-oval blackish species of medium size, allied to *Ochrosidia* but having the mandibles broad, rounded externally, concealed almost wholly beneath the clypeus which is short, sinuate-truncate at apex; legs slender, middle coxae contiguous.

*160. (13829). **D. trachypygus** (Burm.).

Length 15-18 mm. Elongate oblong, male, more oval, female; black or piceous, shining, antennae and legs reddish-brown; elytra each with four feeble costae, these with a row of fine punctures each side; intervals broader, each with three or four rows of punctures.

Common throughout the State, especially beneath weed debris and in muck about the margins of streams and lakes. Abundant also at light.

Genus XLII. LIGYRODES Casey.

Rather large robust convex brown species closely related to *Ligyrus*, but having the thorax not impressed or tuberculate; front tibiae with four teeth; male with claw joint of front tarsi swollen, the large claw dilated and abruptly curved.

161. (13834). **L. relictus** (Say).

Length 16-22 mm. Subcylindrical, convex; black or piceous, shining; under surface and legs chestnut-brown; meso- and metasterna with tufts of long reddish-brown hairs; clypeus trapezoidal, its apex upturned, feebly bifid.

"Biscayne Bay, probably" (Sz. Ms.). No other record and it is very doubtful whether it occurs in the State. Casey's *L. quadripennis*, recorded from Illinois, Louisiana and Texas, may occur in the northern portion.

Genus XLIII. LIGYRUS Burmeister.

In this genus the thorax is impressed in front, with a small tubercle on front of impression; clypeus toothed at apex; front tibiae with three teeth. Male with front tarsi unmodified; claws simple in both sexes. Our first two species belong to the subgenus *Grylius* Casey, characterized by being 20 or more mm. in length and having the mandibles bidentate on outer side, front tuberculate; process behind the fore coxae with apex large, flattened, glabrous in front, ciliate with long bristles behind; sterna glabrous.

*162. (——). **L. lævicollis** Bates.

Length 21-23 mm. Black or dark reddish-brown, shining; under surface and legs chestnut-brown; front widely, shallowly concave; clypeus with apex upturned, feebly bifid, the teeth very obtuse, its base with a transverse ridge ending each side in a small tubercle; impression on apical third of thorax almost circular.

Florida? (Csy. 1915, 190). Chokoloskee (Schf.); Everglade, June August (Dav. Coll.). A Mexican species, known definitely in this country only from Southern Florida.

*163. (——). **L. subtropicus** Blatch., 1922, 30.

Length 27 mm. Oblong, suboval, very robust; dark chocolate-brown, strongly shining, under surface and legs dark reddish-brown; clypeus with teeth triangular, acute, more widely separated than in *laevicollis*, surface transversely rugose, the ridge between the tubercles very low; impression of thorax oblong-oval; punctures of elytra much coarser than in *laevicollis*.

Type from Dunedin; taken at light June 4, 1913. No other record. The largest of our species of the genus.

*164. (13843). **L. gibbosus** (DeG.).

Length 12-15 mm. Broadly oval, robust; dark chestnut-brown, rarely black, much paler beneath; thorax coarsely and sparsely punctate; clypeus in this species and the next not tuberculate but with a transverse ridge at base; mandibles tridentate; prosternal process bristling through-

out with long hairs, and all sterna and margins of femora with similar hairs.

Frequent throughout the State; recorded from six stations, including Jacksonville and the Tortugas Islands, and at hand from six others. Occurs most commonly at light, May to September.

*165. (13847). **L. neglectus** (Lec.).

Length 14-15 mm. Oblong or elongate-oval; reddish-brown throughout; clypeus and front with fewer and smaller punctures than in *gibbosus;* thorax much more finely and sparsely punctate.

Jacksonville (Casy, 1915, 198). Dunedin, March 28, one specimen at porch light (Bl.).

Genus XLIV. APHONUS Leconte.

Medium sized brown species, closely resembling *Ligyrus*, but with mandibles very small, concealed, not toothed on outer side; clypeus with a tridentate transverse process just behind the apex; thorax without apical tubercle or postapical impression.

*166. (13872). **A. variolosus** (Lec.).

Length 13-14.5 mm. Broadly oblong-oval; dark reddish- to chestnut-brown, shining; clypeus deeply concave, the teeth of its subapical carina equal, short, very obtuse; elytral strial punctures coarse, deeply impressed, all in single rows.

Jacksonville (Csy., 1915, 217). Dunedin, April 20, at light (Bl.).

(To be continued)

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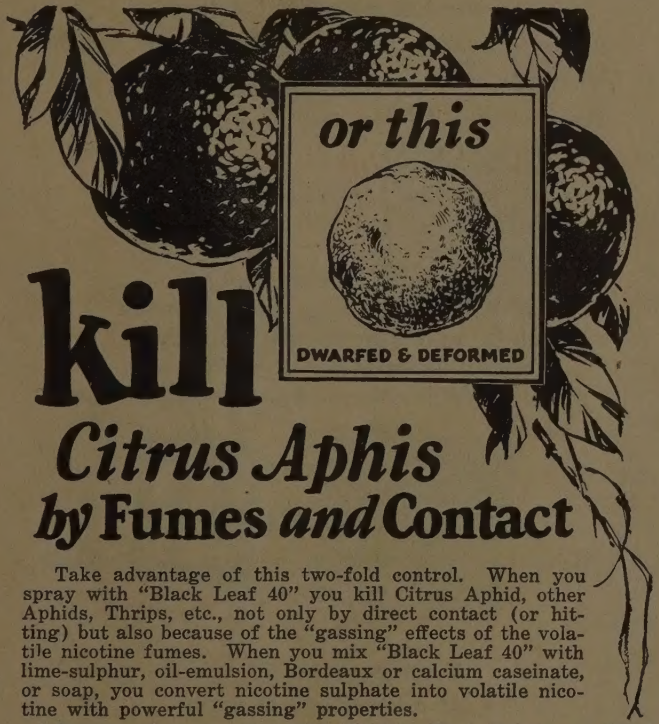

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